

Test example 13:

A stain resistant agent 2 as shown in FIG. 13A is employed and a layer comprising the stain resistant agent 2 is formed on the treated surface of the ceramic product 1 as shown in FIG. 13B. The other condition in the thirteenth test example is the same as that in the first test example.

Test example 14:

A stain resistant agent 2 as shown in FIG. 14A is employed and a layer comprising the stain resistant agent 2 is formed on the treated surface of the ceramic product 1 as shown in FIG. 14B. The other condition in the fourteenth test example is the same as that in the first test example.

Test example 15:

A stain resistant agent 2 as shown in FIG. 15A is employed and a layer comprising the stain resistant agent 2 is formed on the treated surface of the ceramic product 1 as shown in FIG. 15B. The other condition in the fifteenth test example is the same as that in the first test example.

Evaluation:

The following tests were carried out for the aforesaid ceramic products of test examples 1 to 15 and an untreated ceramic product. The tests included scale, lipstick, hair dye, wear and alkali resistance tests as following.

Scale resistance test:

An aqueous solution containing 200 p.p.m. sodium silicate was prepared, so that the glazed layers of the respective products were immersed in the solution at 70°C for three hours. Thereafter, silicic acid deposited on a water reserving surface serving as

a boundary of a water reserving portion was colored by a coloring agent. The ceramic products were evaluated by visual observation. Symbol "O" designates a best product, symbol "Δ" a slightly better product, and symbol "x" a worst product.

5 Lipstick resistance test:

A commercially available oily lipstick was applied to the glazed surface of each product. Each product was left for 48 hours and thereafter, the applied lipstick was wiped away. The ceramic products were evaluated by visual observation. Symbol "O" designates a best product, symbol "Δ" a slightly better product, and symbol "x" a worst product.

Hairdye resistance test:

A commercially available liquid hairdye was applied to the glazed surface of each product. Each product was left for 48 hours and thereafter, the applied hairdye was wiped away. The ceramic products were evaluated by visual observation. Symbol "O" designates a best product, symbol "Δ" a slightly better product, and symbol "x" a worst product.

Wear resistance test:

20 A piece of gauze was held against the glazed layer of each product with a load of about 17 g/cm^2 being applied thereto. Under this condition, the gauze was moved reciprocally at a speed of 12 round trips per minute 2000 times. Changes in a contact angle ($^\circ$) of water in degrees were examined.

25 Alkali resistance test:

The glazed layer of each ceramic product was immersed in an aqueous solution of 0.05 weight percentage of NaOH for 24 hours and changes in the contact angle of water were examined.

The following TABLE 5 shows the results of the tests.

TABLE 5

	Scale	Lipstick	Hairdye	Wear	Alkali
Untreated	×	O	×	-	-
Example 1	O	Δ	O	-13(108→95)	-17(108→91)
Example 2	Δ	Δ	Δ	-22(107→85)	-3(109→106)
Example 3	Δ	Δ	Δ	-35(106→71)	-15(111→96)
Example 4	×	Δ	Δ	-35(107→72)	-22(112→90)
Example 5	×	Δ	Δ	-47(109→62)	-18(111→93)
Example 6	×	Δ	×	-12(83→71)	-34(82→48)
Example 7	×	Δ	Δ	-12(110→98)	-36(101→65)
Example 8	×	Δ	×	-12(104→92)	-41(104→63)
Example 9	×	Δ	×	-11(106→95)	-37(100→63)
Example 10	O	Δ	O	-12(100→88)	-12(103→91)
Example 11	×	Δ	×	-37(93→56)	-16(101→85)
Example 12	×	Δ	×	-37(80→43)	-47(90→43)
Example 13	×	Δ	×	-50(104→54)	-25(80→55)
Example 14	O	Δ	O	-11(112→101)	-14(113→99)
Example 15	O	×	O	-31(107→76)	-17(107→90)

As obvious from test examples 1 to 15 in TABLE 5, it is considered that the stain resistant agent 2 contains the silicon-containing functional group which combines by the dehydration with the hydroxyl group present on the treated surface such as the glazed surface, thereby shielding the hydroxyl group. It is further considered that even when used water contains a large quantity of metal ion such as soluble silica, the hydroxyl group is already disabled or ineffective such that the hydroxyl group does not combine with any metal ion. Accordingly, the soluble silica is not deposited or is not apt to be deposited as silicic acid with network structure such that stain is not apt to be incorporated. Thus, when the stain resistant agent has the silicon-containing functional group, stain such as human waste is prevented from adhering to the ceramic product even when